इंटरनेट मानक

Disclosure to Promote the Right To Information

Whereas the Parliament of India has set out to provide a practical regime of right to information for citizens to secure access to information under the control of public authorities, in order to promote transparency and accountability in the working of every public authority, and whereas the attached publication of the Bureau of Indian Standards is of particular interest to the public, particularly disadvantaged communities and those engaged in the pursuit of education and knowledge, the attached public safety standard is made available to promote the timely dissemination of this information in an accurate manner to the public.

“जानने का अधिकार, जीने का अधिकार”
Mazdoor Kisan Shakti Sangathan
“The Right to Information, The Right to Live”

“पुराने को छोड नये के तरफ”
Jawaharlal Nehru
“Step Out From the Old to the New”

IS 9336 (1979): Cotton Yarn for Underground Cables [TXD 31: Man-Made Fibres, Cotton and their Products]

“ज्ञान से एक नये भारत का निर्माण”
Satyanarayan Gangaram Pitroda
“Invent a New India Using Knowledge”

Act Number 22 of 2005
The Indian Parliament
RIGHT TO INFORMATION

Made Available By
Public.Resource.Org

“ज्ञान एक ऐसा खजाना है जो कभी चुराया नहीं जा सकता है”
Bhartṛhari—Nītiśatakam
“Knowledge is such a treasure which cannot be stolen”

BLANK PAGE

BRUTUM FULMEN

IGNORANTIA JURIS NON EXCUSAT

PROTECTED BY COPYRIGHT

IS : 9336 - 1979
(Reaffirmed 2003)

Indian Standard

SPECIFICATION FOR
COTTON YARN FOR UNDERGROUND CABLES

UDC 677·21·061·1 : 621·315·23

© *Copyright* 1980

INDIAN STANDARDS INSTITUTION
MANAK BHAVAN, 9 BAHADUR SHAH ZAFAR MARG
NEW DELHI 110002

Price Rs 6·00 Gr 3

March 1980

Indian Standard

SPECIFICATION FOR COTTON YARN FOR UNDERGROUND CABLES

Cotton and Cotton Products Sectional Committee, TDC 2

Chairman	*Representing*
SHRI A. SUBRAMANIAM	Madura Coats Ltd, Madurai
Members	
SHRI A. CHELLARAJ (*Alternate* to Shri A. Subramaniam)	
SHRI T. V. ANANTHAN	The Bombay Textile Research Association, Bombay
DR N. BALASUBRAMANIAM (*Alternate*)	
CAPT J. M. L. BANSAL	Naval Headquarters, New Delhi
SHRI HARDIKAR (*Alternate*)	
SHRI M. K. BARDHAN	Ministry of Defence (DGI)
SHRI B. P. SEN (*Alternate*)	
SHRI A. T. BASAK	Inspection Wing, Directorate General of Supplies & Disposals, New Delhi
SHRI G. N. CHATTERJI	Ministry of Defence (R & D)
SHRI R. GHOSH (*Alternate*)	
SHRI A. K. DALMIA	Jaya Shree Textiles & Industries Ltd, Rishra
SHRI K. GOPINATH (*Alternate*)	
SHRI A. C. DASGUPTA	The Delhi Cloth & General Mills Co Ltd, New Delhi
SHRI DHARAM DEV	Office of the Textile Commissioner, Bombay
SHRI S. P. GHOSAL (*Alternate*)	
DIRECTOR OF HANDLOOMS AND TEXTILES	Government of Tamil Nadu
SHRI R. N. JOSHI	The Millowners' Association, Bombay
SHRI R. M. MERCHANT	The Cotton Textiles Export Promotion Council, Bombay
SHRI S. P. MULLICK	National Test House, Calcutta
SHRI GAUTAMBHAI S. NANAVATY	The Ahmadabad Millowners' Association, Ahmadabad
DR P. R. ROY (*Alternate*)	
SHRI J. K. S. NICHOLSON	The East India Cotton Association Ltd, Bombay
SHRI D. G. DAMLE (*Alternate*)	
SHRI C. K. PATEL	Calico Mills, Ahmadabad
SHRI T. RANGASWAMY	The Southern India Millowners' Association, Coimbatore
SHRI T. V. RATNAM	South India Textile Research Association, Coimbatore

(*Continued on page* 2)

© *Copyright* 1980
INDIAN STANDARDS INSTITUTION
This publication is protected under the *Indian Copyright Act* (XIV of 1957) and reproduction in whole or in part by any means except with written permission of the publisher shall be deemed to be an infringement of copyright under the said Act.

(*Continued from page* 1)

Members	*Representing*
Dr P. V. Seshadri	National Textile Corporation Ltd, New Delhi
Shri O. P. Bansal (*Alternate*)	
Shri N. S. Sharma	The All India Federation of Cooperative Spinning Mills Ltd, Bombay
Shri V. N. Subba Rao	Binny Limited, Madras
Dr V. Sundaram	Indian Council of Agricultural Research, New Delhi
Dr V. G. Munshi (*Alternate*)	
Shri D. V. Tyagi	Textiles Committee, Bombay
Shri B. Sivaraman (*Alternate*)	
Shri Harkishon N. Udani	Keshavlal Talakchand (Pvt) Ltd, Bombay
Shri S. M. Chakraborty, Director (Tex)	Director General, ISI (*Ex-officio Member*)

Secretary

Shri O. P. Khullar
Deputy Director (Tex), ISI

Cotton and Cotton Products Subcommittee, TDC 2 : 1

Convener	
Shri C. K. Patel	Calico Mills, Ahmadabad
Members	
Shri A. P. Ananthakrishnan	The Millowners' Association, Bombay
Shri A. T. Basak	Inspection Wing, Directorate General of Supplies & Disposals, New Delhi
Shri D. K. Nandy (*Alternate*)	
Shri A. C. Dasgupta	The Delhi Cloth & General Mills Co Ltd, Delhi
Shri Dharam Dev	Office of the Textile Commissioner, Bombay
Shri S. P. Ghosal (*Alternate*)	
Shri R. Dharamrajan	Modi Spinning and Weaving Mills Co Ltd, Modinagar
Shri R. N. Joshi	The Millowners' Association, Bombay
Shri R. C. D. Kaushik	The Technological Institute of Textiles, Bhiwani
Shri Gautambhai S. Nanavaty	The Ahmadabad Millowners' Association, Ahmadabad
Shri K. R. Sitwala (*Alternate*)	
Shri Madhukant Pranlal	The Ahmadabad Millowners' Association, Ahmadabad
Dr P. R. Roy (*Alternate*)	
Shri T. Rangaswamy	The Southern India Millowners' Association, Coimbatore
Shri B. P. Sen	Ministry of Defence (DGI)
Shri D. R. Yadav (*Alternate*)	
Shri D. R. Sharma	The Century Spinning and Mfg Co Ltd, Bombay
Shri K. G. Sethuram (*Alternate*)	
Shri C. G. Shroff	Standard Mills Co Ltd, Bombay
Shri M. T. Singhi	Maharashtra Cooperative Spinning Mills Federation, Bombay
Shri P. S. N. Swami	The Textile Corporation of Marathwada Ltd, Aurangabad

Indian Standard

SPECIFICATION FOR COTTON YARN FOR UNDERGROUND CABLES

0. FOREWORD

0.1 This Indian Standard was adopted by the Indian Standards Institution on 17 December 1979, after the draft finalized by the Cotton and Cotton Products Sectional Committee had been approved by the Textile Division Council.

0.2 Cotton yarn usually of 2, 4 or 6 strands conforming to this standard is used for binding of various layers of underground telecommunication cables during core formation and also used as quad binder as well as for identification of insulated conductors.

0.3 To familiarize the industry with International System of units (SI Units), the basic SI units as well as the recommended SI units for use in the textile industry are given in Appendix A.

0.3.1 Standards of Weights and Measures Act, 1976 also stipulates use of SI Units.

0.4 For the purpose of deciding whether a particular requirement of this standard is complied with, the final value, observed or calculated, expressing the result of a test or analysis, shall be rounded off in accordance with IS : 2-1960*. The number of significant places retained in the rounded off value should be the same as that of the specified value in this standard.

1. SCOPE

1.1 This standard prescribes the requirements of two varieties of cotton yarn scoured, bleached or dyed, used in underground telecommunication cables.

1.2 This standard does not specify the colour of the dyed yarn (*see also* **2.10**).

---

*Rules for rounding off numerical values (*revised*).

2. REQUIREMENTS

2.1 Count of Yarn — The count of yarn shall be 30s/2 (20 tex × 2) or 40s/3 (14·5 tex × 3) as agreed to between the buyer and the seller. However, a tolerance of ± 5 percent in the count of yarn shall be permissible.

2.2 Breaking Load and Elongation at Break

2.2.1 The average breaking load and elongation at break of yarn shall not be less than that specified in Table 1.

2.2.2 The average breaking load and elongation at break of yarn when determined after heating for 18 hours at 120°C and re-conditioning for 15 hours in the standard atmosphere shall not be less than 90 percent than the values specified in Table 1.

TABLE 1 REQUIREMENTS OF COTTON YARN FOR UNDERGROUND CABLES

(*Clauses* 2.2.1 *and* 2.2.2)

SL No.	CHARACTERISTIC	REQUIREMENT		METHOD OF TEST
		Variety 1	Variety 2	
(1)	(2)	(3)	(4)	(5)
i)	Count of yarn [cotton count (Universal count)]	$30^s/2$ (20 tex × 2)	$40^s/3$ (14·5 tex × 3)	IS : 1315-1977*
ii)	Breaking load of single strand, mN (gf), *Min* (*see* Note)	4 400 (450)	7 350 (750)	IS : 1670-1970†
iii)	Elongation at break, percent, *Min*	3	3	IS : 1670-1970†

NOTE — 1N (Newton) is approximately equal to 0·102 kgf.

*Methods for determination of linear density of yarns spun on cotton system (*first revision*).

†Method for determination of breaking load, elongation at break and tenacity of yarns (*first revision*).

2.3 Moisture Content — The moisture content of the yarn shall not exceed 9 percent when determined in accordance with IS : 199-1973*.

2.4 *p*H Value — The *p*H value of aqueous extract of yarn shall be between 6 and 9 when determined in accordance with IS : 1390-1961†.

---

*Method for estimation of moisture, total size or finish, ash and fatty matter in grey and finished cotton textile materials (*second revision*).

†Methods for determination of *p*H value of aqueous extracts of textile materials.

2.5 Scouring Loss — The scouring loss of yarn shall not exceed 2·0 percent when determined by the method prescribed in IS : 1383-1960*.

2.6 Specific Conductivity of Aqueous Extract — The specific conductivity of aqueous extract of yarn shall not exceed 1 000 μS per centimetre when tested by the method prescribed in IS : 4420-1967†.

2.7 Colour Fastness

2.7.1 The dyes and chemicals to be used for dyeing the yarn shall not tender the yarn when the same undergoes a treatment at a high temperature up to 230°C or during the prolonged storage.

NOTE — Sulphur dyes shall not be used for dyeing the yarn.

2.7.2 The colour fastness ratings of the dyed yarn shall be as given in Table 2.

TABLE 2 COLOUR FASTNESS RATINGS

SL No.	COLOUR FASTNESS TO	RATING	METHOD OF TEST
i)	Water	5 or better	IS : 767-1956*
ii)	Rubbing	5 or better	IS : 766-1956†
iii)	Sublimation	5 or better	IS : 975-1956‡

*Method for determination of colour fastness of textile materials to water.
†Method for determination of colour fastness of textile materials to rubbing.
‡Methods for determination of colour fastness of textile materials to sublimation.

2.8 Knots — The yarn shall be substantially free from knots. The number of knots shall not exceed 1 in 450 metres on an average. A small knot shall be made while joining the yarn and the loose ends shall be trimmed off.

2.9 Freedom from Defects — The yarn shall be reasonably free from leaf particles, neps, snarls, bad knots, slubs, knots with long tails and stains. There shall be no loose ends in the yarn package.

2.10 Sealed Sample — If in order to illustrate or specify the shade, general appearance, lustre, etc, of the yarn, a sample has been agreed upon between the buyer and the seller. The supply shall be made in accordance with the sealed sample.

2.10.1 The custody of the sealed sample shall be a matter of prior agreement between the buyer and the seller.

---

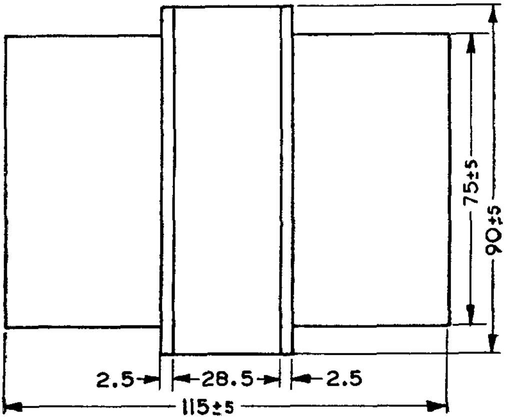
*Methods for determination of scouring loss in grey and finished cotton textile materials.

†Methods for determination of conductivity of aqueous and organic extracts of textile materials.

3. PACKAGING

3.1 In case of Var 1, four or six strands and in case of Var 2, two strands of yarn shall be wound with uniform tension in the form of cheeses on cardboard centres. The ribbon formed in a multi-end yarn shall contain no twist and none of the ends shall be slack. While winding care shall be taken to ensure that the knots, if any, are staggered in the different strands.

Note — The dimensions of cardboard centre and the cheese shall be as given in Fig. 1 unless otherwise specified.



All dimensions in millimetres.

Fig. 1 Cardboard Centre and Cheese

4. MARKING

4.1 Each package of yarn shall be marked with the following:

a) Count of yarn and number of strands;

b) Manufacturer's name, initials or trade-mark;

c) Gross and net mass (*see* Note) of the package; and

d) Any other information required by the buyer or under the law in force.

Note — The net mass of yarn on the package shall be calculated on the basis of dry mass with moisture regain of 8·5 percent.

4.1.1 The package may also be marked with the ISI Certification Mark.

NOTE — The use of the ISI Certification Mark is governed by the provisions of the Indian Standards Institution (Certification Marks) Act and the Rules and Regulations made thereunder. The ISI Mark on products covered by an Indian Standard conveys the assurance that they have been produced to comply with the requirements of that standard under a well-defined system of inspection, testing and quality control which is devised and supervised by ISI and operated by the producer. ISI marked products are also continuously checked by ISI for conformity to that standard as a further safeguard. Details of conditions under which a licence for the use of the ISI Certification Mark may be granted to manufacturers or processors, may be obtained from the Indian Standards Institution.

5. PACKING

5.1 The cheeses shall be wrapped with polyethylene film of minimum 40 microns thickness and packed in accordance with the procedure laid down in IS : 293-1967* or IS : 1347-1972† as the case may be.

6. SAMPLING

6.1 Lot — The quantity of yarn of the same variety delivered to a buyer against a despatch note shall constitute the lot.

6.2 The conformity of the lot to the requirements of this standard shall be determined on the basis of tests carried out on the sample selected from the lot.

7. SCALE OF SAMPLING

7.1 Unless otherwise agreed to between the buyer and the seller, the number of packs to be selected at random from a lot shall be as per Table 3.

8. PREPARATION OF TEST SAMPLES

8.1 From each of the selected cheeses, as prescribed in col 1 and 2 of Table 3, adequate length of test specimens shall be cut to conduct all physical tests. There shall be as many test specimens as the number of cheeses. The specimens thus cut shall constitute the test sample for determining:

a) breaking load and elongation at break,

b) count of yarn, and

c) knots and freedom from defects.

---

*Code for seaworthy packaging of cotton cloth and yarn (*second revision*).
†Code for inland packaging of cotton cloth and yarn (*first revision*).

TABLE 3 SCALE OF SAMPLING AND PERMISSIBLE NUMBER OF DEFFECTIVES

(*Clauses* 7.1, 8.1 *and* 9.1.1)

NUMBER OF CHEESES IN THE LOT (1)	NUMBER OF CHEESES TO BE SELECTED (2)	NUMBER OF SPECIMENS FOR PHYSICAL TESTS (3)	PERMISSIBLE NUMBER OF DEFECTIVES (4)
Up to 50	3	3	0
51 ,, 100	8	8	0
101 ,, 300	13	13	1
301 ,, 500	20	20	2
501 and above	32	32	3

8.2 For testing moisture contents *p*H value, scouring loss, specific conductivity of aqueous extract, and colour fastness, two specimens for a lot of 150 cheeses and 3 specimens for a lot size of above 150 shall be taken and tested from the cheeses drawn in accordance with **8.1**.

8.3 If the test specimens taken as prescribed in **8.1** and **8.2** fail in any of the characteristic, it shall be called a defective lot.

9. CRITERIA FOR CONFORMITY

9.1 The lot shall be considered as conforming to the specification if **9.1.1** and **9.1.2** are satisfied.

9.1.1 The number of defectives found in the specimens taken as prescribed in col 1, 2 and 3 of Table 3 and tested to the characteristics given in **8.1** shall not be greater than the corresponding permissible number of defectives (*see* col 4 of Table 3).

9.1.2 All the specimens tested for the chemical properties (*see* **8.2**) shall pass the test.

APPENDIX A

(*Clause* 0.3)

SI UNITS

TABLE 4 INTERNATIONAL SYSTEM UNITS

Base Units

QUANTITY	UNIT	SYMBOL
Length	metre	m
Mass	kilogram	kg
Time	second	s
Electric current	ampere	A
Thermodynamic temperature	kelvin	K
Luminous intensity	candela	cd
Amount of substance	mole	mol

Supplementary Units

QUANTITY	UNIT	SYMBOL
Plane angle	radian	rad
Solid angle	steradian	sr

Derived Units

QUANTITY	UNIT	SYMBOL	DEFINITION
Force	newton	N	$1\ \mathrm{N} = 1\ \mathrm{kg.m/s^2}$
Energy	joule	J	$1\ \mathrm{J} = 1\ \mathrm{N.m}$
Power	watt	W	$1\ \mathrm{W} = 1\ \mathrm{J/s}$
Flux	weber	Wb	$1\ \mathrm{Wb} = 1\ \mathrm{V.s}$
Flux density	tesla	T	$1\ \mathrm{T} = 1\ \mathrm{Wb/m^2}$
Frequency	hertz	Hz	$1\ \mathrm{Hz} = 1\ \mathrm{c/s}\ (\mathrm{s^{-1}})$
Electric conductance	siemens	S	$1\ \mathrm{S} = 1\ \mathrm{A/V}$
Electromotive force	volt	V	$1\ \mathrm{V} = 1\ \mathrm{W/A}$
Pressure, stress	pascal	Pa	$1\ \mathrm{Pa} = 1\ \mathrm{N/m^2}$

TABLE 5 RECOMMENDED SI UNITS FOR TEXTILES

SL No.	CHARACTERISTIC	SI UNITS		APPLICATION
		Unit(s)	Abbreviation(s)	
(1)	(2)	(3)	(4)	(5)
1)	Length	Millimetre	mm	Fibres
		Millimetre, centimetre	mm, cm	Samples, test specimens (as appropriate)
		Metre	m	Yarns, ropes, cordages, fabrics
2)	Width	Millimetre	mm	Narrow fabrics
		Centimetre	cm	Other fabrics
		Millimetre, centimetre	mm, cm	Samples, test specimen (as appropriate)
		Centimetre, metre	cm, m	Carpets, druggets, *DURRIES* (as appropriate)
3)	Thickness	Micrometre (micron)	μm	Delicate fabrics
		Millimetre	mm	Other fabrics, carpets, felts
4)	Linear density	Tex	tex	Yarns
		Millitex	mtex	Fibres
		Decitex	dtex	Filaments, filament yarns
		Kilotex	ktex	Slivers, ropes, cordages
5)	Diameter	Micrometre (micron)	μm	Fibres
		Millimetre	mm	Yarns, ropes, cordages
6)	Circumference	Millimetre	mm	Ropes, cordages
7)	Threads in fabric:			Woven fabrics (as appropriate)
	a) Lengthwise	Number per centimetre	ends/cm	
		Number per decimetre	ends/dm	
	b) Widthwise	Number per centimetre	picks/cm	
		Number per decimetre	picks/dm	
8)	Warp threads in loom	Number per centimetre	ends/cm	Reeds
9)	Stitches in the knitted fabric:			Knitted fabrics (as appropriate)
	a) Lengthwise	Courses per centimetre	courses/cm	
		Courses per decimetre	courses/dm	
	b) Widthwise	Wales per centimetre	wales/cm	
		Wales per decimetre	wales/dm	

(*Continued*)

TABLE 5 RECOMMENDED SI UNITS FOR TEXTILES — *Contd*

SL No.	CHARACTERISTIC	SI UNITS		APPLICATION
		Unit(s)	Abbreviation(s)	
(1)	(2)	(3)	(4)	(5)
10)	Stitch length	Millimetre	mm	Knitted fabrics Made-up fabrics
11)	Mass per unit area	Grams per square metre	g/m^2	Fabrics
12)	Mass per unit length	Grams per metre	g/m	Fabrics
13)	Twist	Turns per centimetre Turns per metre	turns/cm turns/m	Yarns, ropes (as appropriate)
14)	Test or gauge length	Millimetre, centimetre	mm, cm	Fibre, yarns and fabric specimens (as appropriate)
15)	Breaking load	Millinewton	mN	Fibres, delicate yarns (individual or skeins)
		Newton	N	Strong yarns (individual or skeins), ropes, cordages, fabrics
16)	Breaking length	Kilometre	km	Yarns
17)	Tenacity	Millinewton per tex	mN/tex	Fibres, yarns (individual or skeins)
18)	Twist factor or twist multiplier	Turns per centimetre × square root of tex Turns per metre × square root of tex	$\text{turns/cm} \times \sqrt{\text{tex}}$ $\text{turns/m} \times \sqrt{\text{tex}}$	Yarns (as appropriate)
19)	Bursting strength	Newton per square centimetre	N/cm^2	Fabrics
20)	Tear strength	Millinewton Newton	mN N	Fabrics (as appropriate)
21)	Pile height	Millimetre	mm	Carpets
22)	Pile density	Mass of pile yarn in grams per square metre per millimetre pile height	$g/m^2/mm$ pile height	Pile carpets
23)	Elastic modulus	Millinewton per tex per unit deformation	mN/tex/unit deformation	Fibres, yarns, strands

INDIAN STANDARDS ON COTTON PRODUCTS

IS:

171-1973	Cotton yarn, grey (*second revision*)
174-1965	Flannelettes (*revised*)
176-1965	Bedtickings (*revised*)
177-1977	Cotton drills (*third revision*)
178-1977	Cotton twills (*revised*)
179-1977	Dosuti (*second revision*)
180-1965	Cotton sheetings (*revised*)
181-1965	Leopard cloth (*revised*)
182-1965	Mazri (*revised*)
186-1965	Mulls (*revised*)
187-1965	Long cloth (*revised*)
188-1965	Cotton poplins (*revised*)
293-1967	Seaworthy packaging of cotton cloth and yarn (*second revision*)
1142-1957	Cotton cambric, scoured, for oil dressed fabric
1143-1973	Cotton mosquito netting, square mesh (*first revision*)
1144-1973	Cotton cellular shirting (*first revision*)
1347-1972	Inland packaging of cotton cloth and yarn (*first revision*)
1423-1973	Cotton gaberdine (*first revision*)
1431-1973	Cotton mosquito netting, round mesh (*first revision*)
1535-1960	Cotton lining cloth, dyed
1544-1973	Cotton calico (*first revision*)
1782-1961	Cotton lining cloth (warp faced satin), dyed
2422-1963	Cotton fabric, dyed, water-resistant
2457-1963	Cotton umbrella cloth, waterproofed (*first revision*)
2613-1964	Cotton drill (non-waterproofed) for umbrellas
3040-1965	Indian kapok for stuffing purposes
3566-1966	Viscose rayon cut staple (spun) yarn
5088 (Part I)-1969	Textiles for ammunition: Part I Fabrics used in the manufacture of propellant charges and other purposes
5088 (Part II)-1969	Textiles for ammunitition: Part II Cotton drill, olive green proofed, used in the manufacture of bandoliers
5485-1969	Cotton yarn waste
6612-1972	Unteased white cotton waste
7056-1973	Cotton huckaback towels
7085-1973	Polyester cotton shirting
7104-1973	Poplin (market variety)
7119-1973	Cotton cloth for *Pagris* and *Pags*
7851-1975	Wash and wear requirements for cotton fabrics
7866-1975	Blended yarn